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POLLUTION PREVENTION AND WASTE MANAGEMENT GUIDELINES FOR
POLYCHLORINATED BIPHENYLS (PCB). 1978.

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POLLUTION PREVENTION
AND
WASTE MANAGEMENT GUIDELINES
FOR
POLYCHLORINATED BIPHENYLS
(PCB)

November 1978

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Ontario

Ministry
of the
Environment

The Honourable
Harry C. Parrott, D.D.S.,
Minister

K.H. Sharpe,
Deputy Minister

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These guidelines identify Provincial PCB waste management and pollution prevention measures intended to complement programs already existing or to be undertaken by Environment Canada under The Environmental Contaminants Act. In addition, criteria and standards which may be used in PCB waste management and pollution prevention are included.

The Province of Ontario supports the initiatives of Environment Canada in the management of PCBs.

INTRODUCTION

Polychlorinated biphenyls (PCBs) have been identified as a significant environmental contaminant in Ontario resulting in the implementation of regulatory and abatement programs by the Government of Canada and the Province of Ontario.

The primary purpose of these regulatory and abatement programs is to reduce or eliminate inputs of PCB to the environment which, either by direct exposure or via food chain biomagnification, may impact on man.

From a practical standpoint, the total elimination of all inputs, while desirable, is not achievable.

Provincial controls will be directed towards the abatement of PCB losses from existing uses and the development of proper disposal facilities for PCB wastes.

All existing equipment containing PCB will be labelled and monitored under a program to be instituted by Environment Canada.

Definition of Problem

Information obtained by Environment Canada from a survey of all users of PCB indicates that, as of September, 1978, almost all the current usage (99.98 per cent) of PCB in Ontario, a total of approximately 19 million pounds (8500 tonnes) is in electrical equipment.

There is also some minor usage as hydraulic fluids and heat transfer fluids. Thus, the control of inputs from existing usage will be mainly concerned with the control of inventories of PCB in electrical equipment.

Prior to 1972, Monsanto Chemical Corporation, the only North American manufacturers, marketed PCB for a variety of dispersive applications such as in sealants and caulking, surface coatings, hydraulic fluids, heat transfer fluids and specialty printing inks.

Losses of PCB from the disposal of these products is believed to be a major contributor to the current environmental problem. At the same time, waste collection systems have become contaminated by the disposal of wastes from these former uses such that there is widespread evidence of PCB contamination in sewage sludge, waste oils, mineral transformer oils, recycled papers, scrap metal yards, etc.

These sources of PCB represent a second order of priority with respect to the control of inputs of PCB to the environment.

Nomenclature

PCBs, or Polychlorinated Biphenyls or chlorobiphenyls are known by a variety of trade names.

Some of the more common ones encountered are:

Askarel	DK (Decachlorodiphenyl)
Asbestol	Pyranol
Chlorextol	No-Flamol
Diaclor	Pyralene
Aroclor	Inerteen
Clophen	Therminol FR
Kaneclor	Pydraul
Dykanol	Solvol
Fenclor	Saf-T-Kuhl
Phenoclor	

APPLICATION OF THE GUIDELINES

These waste management guidelines apply to the management and disposal of all materials containing in excess of 100 mg/kg (100 ppm or 0.01 percent) PCB.

Specific controls for materials and conditions involving PCB contents less than 100 mg/kg will be considered on an individual basis and separate guidelines may be issued.

Reference should be made to "Interim Guideline for the Management of Waste Materials Containing Polychlorinated Biphenyls" (Appendix II), published by the Waste Management Branch, Environmental Impact Directorate, Environment Canada, for information on the identification, collection, transportation, storage, treatment, management and disposal of PCB.

GUIDELINE FOR
PCB
POLLUTION PREVENTION

GUIDELINE FOR PCB POLLUTION PREVENTION

(See explanatory notes on Page 14)

General

1. An assessment of the potential environmental and public health impacts of a particular installation should be undertaken to determine whether the application of any of the PCB pollution prevention measures is necessary.
2. Where a particular piece of electrical equipment containing PCB is in a safe location remote from direct access to natural waters, exhibits no potential for leaks, etc., and is operating satisfactorily, there seems little to be gained by removing the equipment or replacing the insulating fluid. (See footnote, Page 1, Environment Canada Interim Guidelines).
3. Waste oil collected in gravity separator systems should be retained and disposed according to instructions for PCB liquids or PCB contaminated waste oils discussed later.

Containment Systems

1. Containment systems must be sized to accommodate the total liquid contents of the electrical equipment taking into account the volume of any equipment within the containment system.
2. The containment may be constructed of mild steel, concrete or other appropriate material. Concrete should be rendered impervious to PCB by the use of epoxy coating or other oil resistant surface finish.
3. Where containment systems have been installed to collect spillage, some provision must be made to prevent this collected material from entering surface drainage systems. This may be achieved by preventing rainfall and other precipitation from entering the containment system or by the installation of a gravity separator to remove PCB from the contaminated drainage. Where possible, the former option is to be preferred.

4. A containment system associated with electrical equipment installed in a sump or a vault should not be connected to the sump drainage which is often an electric pump connected to the sewer system.

Replacement of Equipment

In installations where significant direct exposure to the general public is likely to result from a major spill or in installations in institutions where evacuation of residents in the event of an emergency would be difficult, the owners should be advised to consider the replacement of the equipment.

Replacement of PCB Fluid

1. Replacement of the PCB fluids in existing installations should not be encouraged unless there is a significant environmental or public health benefit to be achieved.
2. Replacement of PCB fluids with non-PCB alternatives should be undertaken at those installations where direct input

to the aquatic environment or input to a potable water supply would result from a spill. Where this is not feasible, such installations should be equipped with containment systems.

GUIDELINE FOR THE
DECONTAMINATION OF
ELECTRICAL EQUIPMENT

GUIDELINE FOR THE DECONTAMINATION OF ELECTRICAL EQUIPMENT

Reference should be made to "Interim Guidelines for the Management of Waste Materials Containing PCB", published by the Environmental Impact Control Directorate of Environment Canada, respecting the decontamination of equipment containing PCB, bulking of wastes, safety practices and disposal practices.

To supplement the measures recommended by Environment Canada, the following procedures should be followed:

1. The equipment (transformer) should be drained by opening the drain valve or puncturing the unit and allowed to drain into an appropriate container for at least 24 hours;
2. The drain valve should then be closed or the unit sealed and filled with solvent (see Environment Canada guidelines for the appropriate solvent) and left filled for at least 24 hours;
3. The solvent should then be drained and the transformer rinsed two more times by filling and draining with clean solvent;
4. The second and third rinses may be retained for use as the first rinse in decontaminating other equipment;

5. All rinses should be disposed as PCB liquids when the PCB content exceeds 100 mg/kg (0.01 percent);
6. The decontaminated equipment may be disposed in any landfill authorized to accept industrial solids or by sale as scrap metal.

GUIDELINE FOR

PCB

WASTE DISPOSAL

GUIDELINE FOR PCB WASTE DISPOSAL

TYPE OF WASTE	ACCEPTABLE METHOD OF DISPOSAL	COMMENTS
1. PCB liquids	a) high temperature incineration b) interim storage	See explanatory note No. 1, Page 16 - incineration may include use as supplementary fuel in cement kiln where approved
2. PCB contaminated solid wastes	a) high temperature incineration (with shredding) b) landfill approved for hazardous wastes c) interim storage	See explanatory note No. 2, Page 17
3. Sewage sludge	As directed	See explanatory note No. 4, Page 18
4. Waste oils	a) high temperature incineration b) supplementary fuel in approved facilities, eg., cement kiln c) re-refining	See published "Interim Guidelines Respecting PCB in Waste Oils" also explanatory note No. 5, Page 20

TYPE OF WASTE	ACCEPTABLE METHOD OF DISPOSAL	COMMENTS
5. Electrical scrap		
a) transformers and large capacitors	- after draining and decontamination, solids to landfill or scrap metal recovery	- see Federal guidelines and explanatory note No. 6, Page 21
b) small capacitors	- place in suitable container (drum) for disposal in approved landfill	- see explanatory note No. 3, Page 17
6. Spill Clean-up		
a) liquids	- collection in suit- able container (drum) and disposed as above	- see explanatory note No. 7, Page 22
b) solids, including soils	- collection in suit- able container (drum) for disposal as above	

INTERIM STORAGE

In the event that disposal facilities are not available, PCB wastes should be placed into interim storage, consistent with the general concepts of the pollution prevention guidelines, until such time as disposal facilities become available.

Off-site interim storage of PCB wastes should only be entertained in facilities having an appropriate Certificate of Approval from the Ministry of the Environment.

TENTATIVE CRITERIA

FOR

PCB

TENTATIVE CRITERIA FOR PCB

PCB in Fish 2 mg/kg (ppm)

PCB in Potable
Water Supplies 1 ug/l

General PCB
Contamination 100 mg/kg

PCB in Waste Oils:

Road Oils 25 mg/kg (ppm)

Recycling 25 mg/kg

Supplementary Fuel 100 mg/kg

General Water
Quality Non-detectable

1. The first step in the process of PCB pollution prevention is to identify the sources of PCBs in the facility.

There are three approaches which can be used to identify the sources of PCBs in a facility:

1. Review the facility's records for PCBs, including purchase orders, invoices, and shipping manifests.

2. Conduct a visual inspection of the facility.

3. Consult with the facility's personnel who are responsible for the handling of PCBs.

Once the sources of PCBs have been identified, the next step is to develop a plan to prevent PCB pollution.

The plan should include measures to prevent the release of PCBs into the environment, such as:

1. Proper handling and storage of PCBs.

EXPLANATORY NOTES ON

the Guideline for PCB Pollution Prevention

THE GUIDELINE FOR PCB

1. The purpose of this guideline is to provide a framework for the development of a PCB pollution prevention plan.

POLLUTION PREVENTION

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1. Review the facility's records for PCBs, including purchase orders, invoices, and shipping manifests.

2. Conduct a visual inspection of the facility.

3. Consult with the facility's personnel who are responsible for the handling of PCBs.

Once the sources of PCBs have been identified, the next step is to develop a plan to prevent PCB pollution.

The plan should include measures to prevent the release of PCBs into the environment, such as:

1. Proper handling and storage of PCBs.

2. Proper disposal of PCBs.

3. Proper labeling of PCBs.

4. Proper training of personnel.

EXPLANATORY NOTES ON GUIDELINE FOR PCB POLLUTION PREVENTION

There are three approaches which can be used to prevent PCB losses from existing electrical equipment, specifically from transformers:

1. Construction of containment systems around the equipment with sufficient capacity to hold and retain the total content of the equipment in the event of a major emergency or spill;
2. Replacement of the PCB fluid in the equipment by an environmentally acceptable alternative insulating fluid;
3. Total replacement of the equipment with a unit containing an environmentally acceptable alternative insulating fluid.

These measures are of particular value when applied to electrical transformers but may also be applied to other equipment.

Large capacitor banks containing greater than 450 litres (approximately 100 gallons) of PCB insulating fluid should be treated as a transformer installation.

Other capacitor installations may vary from small ballasts in fluorescent lights to large power-factor capacitors in industrial plants. These units are often pole mounted or in other inaccessible locations. Usually, the quantity

of PCB in capacitors is small and may amount to no more than 10 gallons in the large power-factor units. Furthermore, even in the event of total failure and rupture, the quantity of loss is quite small since most of the PCB is impregnated into paper insulating materials.

With respect to the replacement of fluids, studies conducted by Dow Corning in the U.S. indicate that replacement fluids become contaminated with PCB to the extent of about 3 percent due to slow migration of PCB from within the electrical windings of the equipment. In the event of loss, this replacement fluid, contaminated to a significant level of PCB, would also require the same degree of concern as the original fluid.

For this reason, replacement of PCB fluids is only recommended where there is a significant environmental or public health benefit to be gained.

EXPLANATORY NOTES ON GUIDELINE FOR PCB WASTE DISPOSAL

Note No. 1 - PCB Liquids

Criteria have been established for the high temperature destruction of PCB liquids in commercial incinerators both by the United States Environmental Protection Agency and Environment Canada. These are as follows:

1. 2 second dwell times at 1200°C and 3 percent excess oxygen;
2. 1.5 second dwell time at 1600°C and 2 percent excess oxygen.

Emission controls and gas scrubbing equipment are also necessary to control the hydrogen chloride generated in the incineration of PCB wastes.

Experimental studies have demonstrated the effectiveness of destruction of PCB and other chlorinated hydrocarbons when used as a supplementary fuel and source of chlorine for low alkali cement production. Destruction efficiencies of up to 99.986 percent of PCB with no detectable emission were measured in these experiments. At the present time, November, 1978, the application of this technology at St. Lawrence Cement in Mississauga is under review and will be the subject of a public hearing before a panel of the Environmental Assessment Board.

Note No. 2 - PCB Solid Wastes

PCB solid wastes must be disposed in landfill sites that are authorized to accept hazardous wastes or subjected to high temperature incineration in suitable facilities such as a rotary kiln or fluidized bed incinerator.

Until facilities become available in Ontario, wastes should be stored or disposed at facilities in the United States which comply with relevant Federal and State regulations.

Scrap capacitors may be disposed at authorized landfill sites or by shredding and high temperature incineration.

Note No. 3 - Industrial and Municipal Garbage

All municipal solid waste is likely to be contaminated with PCB from the disposal of small capacitors in fluorescent lights and household appliances as well as the disposal of contaminated materials from past dispersive uses of PCB.

Municipal garbage disposal does not appear to be a significant source of PCB input to the aquatic environment. Analyses of groundwater leachate from landfill sites has shown minimal levels of PCB. Atmospheric emissions

from municipal garbage incinerators are a source of PCB but, depending upon temperature and other conditions in the incinerator, some proportion of the PCB input to such incinerators is likely to be destroyed.

On the basis of these assessments, therefore, current disposal practices appear to be the best available option to deal with the low level PCB contamination in municipal solid wastes.

Small capacitor manufacturers and other industries where scrap capacitors containing PCB may be accumulated in significant (drum lot) quantities should collect these wastes in drums for shipment to an approved land disposal site.

Note No. 4 - Sewage Sludge

Most municipal sewerage systems contain low levels of PCB. Some 60 percent of this PCB becomes associated with sewage sludge and the remainder is discharged in the treated sewage. The disposal of the sewage sludge, therefore, may contribute further input of PCB to the environment.

A survey of Ontario sludge disposal practices has been completed under a Canada-Ontario Agreement Research Report (COA Project 74-3-19). This report gives a breakdown

of sludge disposal as follows:

- 40 percent incineration;
- 22 percent land disposal;
- 34 percent application to agricultural soils;
- 4 percent to other methods such as lagoons.

Studies conducted by the Ontario Research Foundation on behalf of Environment Canada, have indicated that sewage sludge incinerators can achieve up to 98 percent destruction of PCB in the sludge.

Of particular concern, therefore, is the use of municipal sewage sludge on agricultural lands and the potential uptake of PCB by food crops.

On the basis of an estimated total of 300 kg/year of PCB associated with sewage sludge in Ontario, we may conclude that the total loading of PCB on agricultural land in Ontario is about 100 kg/year.

Detailed studies on the impact of PCB on soils at land disposal sites, and on soils and crops associated with the practice of spreading sewage sludge are currently underway as part of COA Project 76-3-26. The report on this project is scheduled to be completed in March, 1979. At that time, when the data are available, the need to amend current controls on sewage sludge disposal practices will be considered. Preliminary results from this study indicate essentially no PCB uptake by crops.

Preliminary studies on the uptake of PCB by crops, conducted by the Canadian Department of Agriculture in 1972 and 1973 appear to suggest that corn and mixed grain crops exhibit some potential to accumulate PCB residues. The levels detected, however, are very low and range from 5 parts per billion to 95 parts per billion.

On the basis of these assessments, further control of sewage sludge disposal relative to the PCB content would not be appropriate at this time until the studies now underway are completed.

Note No. 5 - Waste Oils

PCB contamination in waste oils has recently been identified. In general, most oil collected by commercial waste oil collectors appears to exhibit some level of PCB contamination.

The origins of this contamination are essentially unknown but probably are the result of long-standing contamination of the collection system from past unregulated disposal of PCB transformer oils, hydraulic fluids and heat transfer fluids.

Because of this ubiquitous PCB contamination of waste oils, emphasis should be placed on the non-dispersive use of the waste oil such as in re-refining in which the PCB content is reduced and the oil reconstituted as a

lubricant. Alternatively, the use of the oil as a supplementary fuel in which the PCB is destroyed should be considered.

These considerations have been incorporated into published interim guidelines respecting the PCB content of waste oils. (See Appendix IV).

Note No. 6 - Electrical Scrap

Electrical scrap of various types from electrical contractors, public utilities and Ontario Hydro exhibits varying degrees of PCB contamination. This arises from past uses of PCB in insulating materials, from PCB contamination in petroleum-base mineral transformer oils and from the past receipt of PCB transformers and capacitors by scrap merchants.

1. Scrap which exhibits PCB contamination greater than 100 mg/kg should be treated as a PCB solid. Other materials, oils, etc., should be handled consistent with previously stated guidelines.

2. In general, PCB contaminated solids should be isolated from liquids.

3. Mineral oil transformers that are PCB contaminated (less than 100 mg/kg PCB) should be drained, allowed to stand for 24 hours and drained again. The container can then be sent to a scrap metal dealer and the waste oil retained for appropriate recovery and/or disposal.

4. PCB transformers and those mineral oil units containing more than 100 mg/kg PCB should be drained and decontaminated according to procedures previously described.

5. Solid scrap insulating materials, capacitors, etc., should be drummed and sent to an approved land disposal site.

Note No. 7 - Spill Clean-up

PCB contamination arising from spills often constitutes a unique disposal problem.

PCBs are relatively mobile in soils but can be broken down by soils microorganisms.

The objectives of any spill clean-up program should be to alleviate the environmental damage that has occurred and to prevent direct or indirect human exposure to the PCB residues.

1. All PCB spills should be reported to the Ministry via the contact list appended to these guidelines. (Appendix III).

2. All liquid PCB associated with a spill incident should be collected immediately and retained in drums or other container to prevent further soils contamination.

3. Spills inside buildings and on impervious surfaces may also be further cleaned by the use of solvents and oil sorbent materials.

4. In order to prevent occupational exposure within buildings, remaining PCB residuals may be solvent and detergent washed from impervious surfaces. Solvent washings should be collected for disposal with PCB liquids while final detergent washings may be discharged to the drainage system.

5. Spill residuals on impervious surfaces at exterior locations may be detergent washed or flushed to drainage systems.

6. Contaminated soils resulting from PCB spills should be collected for disposal at authorized land disposal sites.

7. The degree to which contaminated soils are removed should be dictated by the nature of the hazard posed to public health and the environment by the PCB residues in the soil at the spill site. As a general rule, contaminated soils containing greater than 100 mg/kg PCB should be removed from the spill site for disposal at an authorized facility.

8. Contaminated material remaining at the spill site should be covered with clean fill and the site rehabilitated where practicable.

EXPLANATORY NOTES FOR TENTATIVE CRITERIA

EXPLANATORY NOTES

FOR

TENTATIVE CRITERIA

EXPLANATORY NOTES FOR TENTATIVE CRITERIA

The current acceptable maximum level of

level (100%) for the year

level (100%) for the year

level (100%) for the year

EXPLANATORY NOTES FOR TENTATIVE CRITERIA

The absence of accepted criteria for PCB in the environment and regulatory standards for PCB emissions is often an obstacle to constructive action towards PCB pollution abatement. Because all inputs of PCB to the environment may ultimately be accumulated and concentrated in living organisms, and hence enter man's food chain, the ideal criterion for PCB emission is zero. In the opinion of many investigators, the zero tolerance concept is not scientifically sound. It is now apparent that "zero" has no meaning for environmental purposes, since virtually all elements and chemical species can be detected in the environment if analytical techniques are sufficiently sensitive.

In addition, given the fact that PCB is ubiquitous in many effluents and gaseous emissions and in environmental samples, it is essential that emission standards be based on available practicable control technology and identifiable requirements for environmental and public health protection.

Note No. 8 - Workplace Exposure

The current acceptable occupational exposure levels (TLV's) for PCB are:

- 500 ug/m^3 (PCB with 54 percent chlorine)
- 1000 ug/m^3 (PCB with 42 percent chlorine)

These levels are currently under review and a tentative proposal by NIOSH, National Institute for Occupational Safety and Health, is that this be reduced to 1 ug/m^3 .

Note No. 9 - Ambient Air Exposure

At the present time (November, 1978), a proposal for an ambient air criterion for PCB is under development which will be based on current occupational exposure levels and available medical evidence and related to specific analytical methodology.

Note No. 10 - PCB in Fish

The current Canadian standard for PCB in fish for commercial sale is 2 ppm (2mg/kg) maximum. Reference should be made to the interministerial program of sport fish testing, publication of results and recommended consumption levels.

Note No. 11 - PCB in Potable Waters

The general objective for waters for human consumption is no detectable level of PCB ($< 0.01 \text{ ppb}$).

Nevertheless, in the absence of a firm standard, the Ministry proposes a criteria of 1 ug/l or 1 ppb as a basis for determining the need to close down municipal water supplies or assess the suitability of groundwater supplies in the event of a PCB spill or other emergency.

Note No. 12 - General Water Quality

The objective with respect to the protection of general water quality should be the maintenance of a level of PCB in natural waters which does not impair beneficial uses of the waters. The use of natural waters as potable water supplies is a beneficial use and an appropriate PCB criterion has been proposed.

The use of natural waters as habitat for sport and commercial fish is also a significant beneficial use. In this context, a level of PCB in the water which is less than that necessary to induce PCB concentrations greater than 2 ppm in the fish is desirable.

Studies on the exposure of salmonid fish to PCB have indicated that such fish may accumulate and concentrate PCB up to 274,000 times the level of exposure. Thus, a desirable water quality criterion may be some 274,000 times less than the permissible 2 ppm level in fish, ie., 0.007 ppb (7 ng/l).

However, uptake of PCB through ingestion of contaminated sediments, invertebrates, algal and other food chain biomagnification factors may be much more significant.

A water quality criterion of 1 ppt (1 ng/l) was proposed by the United States Environmental Protection Agency in 1973 with a similar rationale. However, the

current level of detectability for PCB in water is about 0.01 ppb (<10 ppt). Furthermore, there is no technology available to reduce PCB in water to these levels. Thus, no detectable PCB in natural water remains as the general objective.

Note No. 13 - PCB Emissions

A general emission criterion of 100 ppm (100 mg/kg) has been proposed by Environment Canada in "Interim Waste Management Guidelines for Polychlorinated Biphenyls". This is consistent with the need to assign priority to the control and safe destruction and disposal of significant quantities of PCB and hence disregard the many diffuse sources of low level emissions.

Nevertheless, where practicable, all sources of PCB emissions should be reduced or eliminated. Thus, those emission sources which are controllable should be controlled.

In the context of determining acceptable emission levels, however, reference should be made to the environmental and public health impact of the emission and the availability of control technology.

Typical commercial PCB mixtures are only soluble in water to the extent of about 0.01 to 0.1 mg/l.

Thus, physical separation processes are unlikely to be effective in the control of aqueous PCB concentrations below 0.1 mg/l.

Carbon adsorption may offer some better alternative but there is no data on this, although work is being undertaken.

ENVIRONMENTAL CONTAMINATION ACT REGULATIONS

The Environmental Contamination Act, implemented in 1973, provides the framework for Canada's environmental protection system. It is a comprehensive legislative framework that sets out the principles and objectives of environmental protection. The Act provides for the establishment of the Environmental Protection Act, which is the primary legislation governing environmental protection in Canada. The Act also provides for the establishment of the Environmental Protection Act, which is the primary legislation governing environmental protection in Canada.

APPENDIX I

LEGISLATIVE AUTHORITY

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ENVIRONMENTAL CONTAMINANTS ACT REGULATIONS

The Environmental Contaminants Act was promulgated in 1976. The Act provides the Government of Canada with the power to conduct investigations to determine whether a particular substance poses a threat to the environment and/or to public health and safety. The Act may be used to restrict or prohibit the manufacture, use and sale of particular substances identified as environmental contaminants.

The intent of this legislation is to provide for the control of environmental contaminants, where control cannot be achieved with existing pollution control legislation, by restriction of manufacture, use and sale.

The first class of substances to be regulated under this Act were PCBs.

The current regulation, Chlorobiphenyls Regulation No. 1, prohibits all uses of PCB except in:

1. electrical capacitors, electrical transformers and associated switch gear and machinery and equipment used to manufacture electrical capacitors, electrical transformers and associated switch gear;
2. heat transfer equipment, hydraulic equipment and vapour diffusion pumps that were designed to use chlorobiphenyls and were in use in Canada before March 1, 1977; and,

3. machinery or equipment, the operation of which is intended to destroy the chemical structure of chlorobiphenyls.

An amendment to Regulation No. 1 is anticipated before the end of 1978, and this will prohibit use of PCB in hydraulic fluids, heat transfer fluids and vapour diffusion pumps.

A further amendment, expected to be effective October 1, 1978, will prohibit all new uses of PCB including the manufacture or import of electrical equipment.

Other regulations that are anticipated include a regulation requiring all those whose activities during a calendar year have involved more than 1 kg of PCB to maintain records of all transactions. This regulation will apply to anyone using more than 1 kg/year of PCB and will include electrical maintenance, transport companies and disposal facilities.

It is not yet intended that these records be reported but it is believed desirable that notification of proposed transactions or movements of PCB be made to regulatory agencies.

A program to label all equipment containing PCB is being instituted by Environment Canada. The labels will be identified by serial number. Each serialized label will be cross-referenced with the serial number of the equipment. This will facilitate the control and monitoring of the use and disposal of existing PCB inventories in electrical equipment.

ONTARIO LEGISLATION

There are no specific regulations pertaining to PCB under The Environmental Protection Act or The Water Resources Act.

Section 15 of The Environmental Protection Act, Section 9 of R.R.O. 15 and Section 32(b) of The Ontario Water Resources Act require that spill incidents and other accidental emissions to the natural environment be reported to the Ministry.

General provisions of The Environmental Protection Act and The Ontario Water Resources Act prohibit the emission of any contaminant that may impair the natural environment or that is prescribed by regulation.

Goals, policies and objectives of the Ministry as stated in "Water Management in Ontario - Goals, Policies, Objectives and Implementation Procedures", endorses the concept that the release into the environment of those substances that may be hazardous at any concentration should be prevented.

There is no legislative authority, however, to require the installation of pollution prevention measures to deal with potential emissions. Pollution control measures are only necessary to abate or eliminate identifiable emissions to the environment. Section 18 of The Environmental Protection Act permits the Regional Director to order persons to have available materials and equipment to alleviate the effects of

environmental contamination. This is, however, primarily related to spill clean-up materials and equipment.

It is for this reason that the pollution prevention measures for the control of potential PCB losses are identified here as pollution prevention guidelines.

Waste disposal facilities for PCB and other wastes are approved and licenced by the Province.

The transportation of wastes is subjected to regulations under The Environmental Protection Act both with respect to licenced haulage and the completion and submission to the Ministry of way-bills identifying the nature and destination of the waste.

A list of Ministry of the Environment staff who may be contacted in the event of a PCB spill is appended to these guidelines. (Appendix III).

APPENDIX II

GUIDELINE FOR THE MANAGEMENT OF WASTE MATERIALS CONTAINING POLYCHLORINATED BIPHENYLS (PCBs)

Waste Management Branch
Environmental Impact Control Directorate

Report EPS 1-EC-78-1
August 1978

ABSTRACT

This report forms the basis of Fisheries and Environment Canada Guidelines on the management of wastes containing hazardous materials. Polychlorinated biphenyls (PCBs) being regulated under the Environmental Contaminants Act, were selected as the initial guideline. This guideline is to provide information on acceptable practices covering the identification through to the disposal of PCBs. In view of various provincial legislations, the management of hazardous wastes is also subject to the requirements of the provinces concerned. This guideline will be revised as new knowledge becomes available.

MANAGEMENT OF HAZARDOUS CONTAMINANTS

APPENDIX (PCB)

- 1.1 Identification
- 2.1 Collection
- 2.2 Transportation
- 2.3 Storage
- 2.5 Treatment
- 2.6 Disposal

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1 INTRODUCTION

The use in commerce of the class of substances known as polychlorinated biphenyls (PCBs) is being regulated under the Environmental Contaminants Act. Regulations governing the management and release to the environment of materials and equipment containing PCBs are being developed and will be promulgated in the near future. This report will provide interim guidance on environmentally acceptable management practices for PCBs.

2 MANAGEMENT OF MATERIALS CONTAINING POLYCHLORINATED BIPHENYLS (PCBs)

2.1 Identification

2.1.1 Electrical Goods

2.1.1.1 Capacitors. Askarel (fluids containing PCBs) has been used as the dielectric fluid in capacitors since about 1935. Consequently, for material management purposes it should be assumed that all power capacitors regardless of size or use contain askarel.

2.1.1.2 Transformers and switchgear*. Askarel has been used in transformers since 1939. Initially Canadian practice was to use the words Inerteen, Aroclor, Pyranol or askarel on the nameplate either as a title "Pyranol Transformer", "Inerteen filled" or by a metal tag attached to the nameplate indicating "askarel", or by indicating in the section of the nameplate showing the number of gallons of fluid "Askarel -- Imp. Gal."

Since 1947, in the case of power transformers (CSA, 1947) and 1959 for distribution transformers (CSA, 1959) the designation "L" is used to indicate a non-flammable fluid. It is used in the type designation for the transformer e.g. a type ONAN transformer is one which is oil immersed with natural cooling. A type LNaN is one with non-flammable fluid (askarel) with natural cooling. Others are LNS, LNP, LNWN, LNAF, LFWN, LFAF or LFAN.

The names Inerteen, Pyranol and Aroclor refer to Canadian usage, imported transformers may use the following names:

Asbestol	Hyvol	Fenclor
Chlorectol	No-Flamol	Kaneclor
Diaclor	Saf-T-Kuhl	Phenoclor
Dykanol	Clophen	Pyralene
Elemex	Pyroclor	Santotherm
Apirolio		

2.1.1.3 Dielectric Fluids. A quick check to differentiate between oil based or askarel based dielectric fluid is to put a drop in a small amount of water: if it sinks it is askarel; if it floats it is oil. However, the oil may be contaminated with small amounts of PCBs and should be analysed.

*NOTE

Retrofilling of existing transformers inventories for the purpose of replacing the askarels with non-PCB fluids is not recommended at this time. When equipment is to be serviced and askarel is to be drained off then it should be replaced by non-PCB fluids. For other servicing activities non-PCB fluids should be used for topping-up. Due consideration should be given to any changes in the transformer's dielectric and heat transfer properties when non-PCB fluids are added.

If the analysis shows that the fluid contains more than 0.01% by weight or 100 ppm of PCBs, then it should be collected and disposed of in the same manner as askarel, that is, incineration (see 2.6.1).

2.1.2 Mechanical Equipment. PCBs have been used in the past as the working fluid in hydraulic systems under the trade name Pydraul (Note: Pydraul series B, C and D do not contain PCBs). PCBs have also been used in the past in heat exchangers under the trade names of Therminol FR and Santotherm FR (Note: only series FR contains PCBs). PCBs have been and still are used as the working fluid in vapour diffusion pumps usually under the trade name of Aroclor 1248, Aroclor 1254, etc. Even if PCBs are no longer used in the equipment, experience has shown that the replacement fluid may still contain some PCBs. This should be determined by analysis and, if the concentration is greater than 0.01% by weight (100 ppm), then the fluid should be treated for disposal in the same manner as pure Aroclor (see 2.6).

2.1.3 Waste Materials. Some waste materials such as used oils, chemical substances and mixtures and cleaning solvents through previous use may have become contaminated with PCBs. If on analysis these wastes contain more than 0.01% by weight or 100 ppm of PCBs then they should be disposed of in accordance with the methods outlined in 2.6. However, no person should deliberately dilute a PCB contaminated waste to bring the concentration below 0.01% by weight or 100 ppm.

2.1.4 Other Goods. Some goods are known to have contained PCBs in the past. In some cases the label may indicate PCB content. Contact the supplier for details or analyze the goods. In fact, if the quantity of goods in use is significant it may well be judicious to have the supplier certify that the goods contain no PCBs. If the concentration of PCBs is greater than 0.01% by weight (100 ppm), then the goods should be disposed of in accordance with the methods outlined in 2.6.

2.2 Collection

The federal government through the regional Environmental Protection Service (EPS) offices and the Federal Activities Branch will handle the collection, transportation and storage of PCBs generated by federal facilities, but they have no mandate to carry out this activity for privately generated material. The collection, transportation and storage of PCBs generated by the private sector could be coordinated by EPS regional personnel utilizing private contractors. In some regions privately-owned and operated licensed waste haulers exist and they could handle the collection. Each region has compiled a list of the names, locations and services offered by these private firms. Contact the EPS regional office (address in Appendix II) to arrange for this coordinating service. Central collection and storage points are indicated. (For further discussion see 2.4.)

2.2.1 Contaminated Materials. Liquid and solid materials that contain more than 0.01% by weight (100 ppm) of PCBs should be put into new No. 16 gauge (single trip) - or 14 gauge (re-usable) 45 gallon drums for storage. It might be possible, if close inspection so indicates, to transport the material to storage in its original container. It would, however, be necessary to protect it against damage during the trip.

2.2.2 Transformers. Unwanted transformers should be drained of their askarel, then washed out with solvent at the generation point (see 2.5). The askarel and washings should be put in drums and sent to storage. The transformers should be resealed, crated and transported to the salvage company or to storage. Alternatively the transformer should be inspected for potential leakage, the leakage repaired if necessary, then crated and shipped to storage where it can be drained of its askarel then rinsed.

2.2.3 Capacitors. Small capacitors such as those used in motor starting, lighting and electronic applications should not be collected individually because of the difficulty in separating them from the normal waste stream. However, manufacturers are encouraged to collect them, and if sufficient quantities are located, they can be handled in the same manner as the larger power capacitors used for phase correction, but need not be packaged as carefully because they contain no fluids. Large power capacitors should be packaged in plastic bags and sealed into No. 16 gauge 45 gallon drums for transport to storage. Capacitors too large to fit into a drum should be heat sealed into a heavy gauge plastic bag and crated for shipment to storage.

2.2.4 Other Equipment. Other types of equipment such as hydraulic pumps and their lines and tanks, heat exchangers and vapour diffusion pumps should be drained of their fluids, washed out with solvent (see 2.5), and the equipment sent to the salvage company for disposal. The fluids and washings should be sent to storage.

2.2.5 Labelling. All barrels, packages, crates and equipment should be labelled with a category 4, red, severe hazard label (see Appendix I).

The label must be made out as follows:

Health: 4	Fire: 1	Environment: 4	Reactivity: 1
Contents:	This equipment, barrel, package, etc., contains PCBs.		
Disposal:			
Handling:			
Originator:	Tel:	Date:	as applicable.

Supplies of all these labels can be obtained from your local EPS office.

2.3 Transportation

2.3.1 Logistics. Materials should be transported by private trucking companies or waste haulers that have demonstrated the knowledge, ability and equipment to move the material as safely as it is moved in commerce and that have been licensed by provincial authorities.

2.3.2 Regulations.

2.3.2.1 Provincial. The regulation of the transport of hazardous materials falls within provincial jurisdiction and there is a variety of regulations. It is the responsibility of the carrier to obtain the necessary permits and to provide waybills and placards.

2.3.2.2 Federal. The Canadian Transport Commission and the Marine Administration and Air Administration of the Department of Transport have regulations covering the movement of dangerous goods via rail, ships and aircraft respectively. It is the carrier's responsibility to comply with both provincial and federal regulations and the shipper should ensure that the carrier is adhering to the above regulations. However, the regulations under the proposed Transport of Dangerous Goods Act when promulgated will supercede all of the above regulations.

2.3.3 EPS Notification. Should a shipment of PCBs be scheduled to cross an inter-provincial or international border the shipper should make the following notification. Such notifications should contain the date of shipment, probable route, name of carrier, name and quantity of the PCBs, vehicle identification, vehicle license numbers and, if available, name of driver.

- (a) The Regional EPS Environmental Emergency Centre (EEC) should be notified 10 working days prior to shipment. A list of names and addresses for each region can be found in Appendix II.
- (b) Before starting the shipment, notify the nearest regional EEC coordinator's office of any possible change in the shipment and its route. It will be the regional coordinator's responsibility to notify the other regional centres involved, and other local authorities if required.
- (c) In the event of a delay, accident or spillage of the material en route, the driver should immediately telephone the nearest regional EEC coordinator's office, giving precise details of the event.

2.4 Storage

PCBs in liquid form will require storage until suitable disposal facilities are in place. Some solid materials may require storage for an extended period of time.

Consideration is to be given to central collection-storage facilities in combination with central disposal facilities in regions across the country. Until central collection-storage facilities are developed, it will be necessary to store materials on the premises of the generator or possibly in leased interim storage facilities. Guidelines covering central collection storage-facilities are being developed.

If any containers or equipment received for storage are not labelled in accordance with 2.2, then labels should be made up.

2.4.1 Facilities. The following serves as guidelines for storage of the materials in the generator's facilities:

- (a) Materials should be stored in an indoor area with controlled ventilation, away from plant traffic and work areas. This will minimize the chance of spills resulting from damage to storage containers.

- (b) The storage area should have a hard finished floor (not just earth). Floor drains should be properly stoppered and the area should be diked with an impervious material to contain any spilled material.
- (c) Liquid and solid materials should be placed in new No. 16 gauge 45 gallon steel drums.
- (d) Supplies of sorbent material should be kept at the storage area and any spills or leakage should be absorbed immediately. The contaminated sorbent should be stored in the same manner as other PCB contaminated solids.

2.4.2 Stored Equipment. Equipment received for storage should have been prepared as outlined in 2.2; if not, the procedures recommended in that section should be followed. In addition, where PCBs might escape to the environment through drippings an ample supply of sorbents should be placed under the equipment.

2.4.3 Inspection. A company official should inspect the stored material monthly to guard against deterioration of containers and to ensure that all materials are properly labelled in accordance with 2.2.5. In addition, inspectors designated under the Environmental Contaminants Act (S.C. 1974-1975, Ch. 72) will inspect the storage area on a regular basis.

2.4.4 Records. Records should be kept by the company of the identity, amount, source and location of all PCB waste materials and equipment containing PCBs that are located in the storage. Within 60 days after the end of the calendar year, a summary should be prepared of the quantities and description of all PCB materials received into, kept in, or transferred out of the storage area. A copy of this should be sent to the regional EPS office.

2.5 Treatment

2.5.1 Decontamination*. As a general concept, no container that has contained PCBs should enter the waste stream until it has been treated with the equivalent of a triple rinse with solvent. The volume of solvent for each rinsing should be approximately 10% of the volume of the container being rinsed. It is the intent of EPS that the PCB content of the container should be reduced to as close as possible to the maximum allowable PCB content of 0.01% (100 ppm) by weight. From the point of view of disposal of the rinsings acceptable solvents include No. 1 or 2 fuel oil, kerosene and mineral oil. Where solvent flammability is a problem, ethylene glycol may be used. The solvent can be reused as the finishing or final wash until the concentration of the PCBs dissolved in it reach 0.01% (100 ppm) by weight, then all rinsing materials should be treated as a PCB contaminated fluid.

Containers include drums, cans, tanks, equipment such as transformers, pumps and their lines, and heat exchangers. After decontamination, they should be labelled as "has contained PCBs". The rinsing activity should take place wherever containers enter the waste stream such as at the waste generator's facilities, barrel-reclaimer facilities, salvage facilities, repair facilities and at the collection, storage and disposal facilities.

***NOTE**

Cold temperatures slow down the rate of dissolution, rate of drainage, and the actual level of solubility of PCBs in solvents. This effect should be considered when going through these rinsing procedures. If temperatures approach 0°C then the work should be put off or conducted in a heated area.

2.5.2 *Bulking.* Waste materials that are generated in small quantities should be bulked into 45 gallon drums for transport and storage. The emptied containers then should be decontaminated by rinsing prior to being discarded.

2.5.3 *Safety.* Industrial chemical handling practices should be followed. Skin contact, inhalation and ingestion are to be avoided. Protective clothing, PVA or Viton gloves and face shields are required and, in extremely hot weather, ventilation is recommended. Rubber or neoprene gloves and rubber impregnated protective clothing, if used, should be discarded *immediately* after use and treated as a PCB contaminated material.

It has been reported that when an electrical arc occurs in a capacitor that has been filled with askarel, a decomposition occurs and hydrogen gas is produced. To avoid the danger of fire or explosion, it is essential that the porcelain insulators be broken off the capacitor with a non-sparking tool, for example a non-ferrous mallet or a piece of 2 x 4, prior to any other action designed to open up the capacitor casing.

2.6 Disposal

A method of disposal of PCBs that has been shown to be satisfactory is by thermal destruction. This method is applicable to all liquids, capacitors, and some solids. Contaminated soil, dredge spoil, solids not acceptable for incineration and equipment and containers that have been decontaminated can be disposed of in a carefully managed and designed government approved landfill (this landfill recommendation is an interim measure only). Due consideration, however, should be given to the amounts of PCBs expected to be received at a given site.

2.6.1 *Incineration.*

2.6.1.1 *Requirements.* The United States Environmental Protection Agency (U.S. E.P.A.) has conducted a laboratory study (Duvall and Rudey, 1977) that showed that PCBs when exposed for one second to temperatures of 640°C, began to decompose and at 740°C, 95% molecular destruction occurred and 99.995% molecular destruction was found at 1000°C. Also, it was determined that PCBs thermally decompose to low molecular weight products. However, the recommended criteria for commercial incinerators are:

- 1) 2 second dwell time 1200°C (2200°F) 3% excess oxygen;
- 2) 1.5 second dwell time 1600°C (2900°F) 2% excess oxygen (U.S. Federal Register Vol. 42 No. 100, May 24, 1977).

The thermal destruction of one pound of transformer askarel produces approximately one-half pound of hydrogen chloride which can be removed by an alkaline water scrubber.

2.6.1.2 *Liquids in cement kilns.* EPS has demonstrated that a wide range of chlorinated hydrocarbons, including PCBs, can be utilized as a partial replacement for No. 6 fuel oil in a cement kiln (MacDonald et al, 1977) with little or no discharge to the environment.

2.6.2 Landfill. Contaminated soil, contaminated dredge spoil, and decontaminated containers may be buried in a government approved landfill. Guidelines on landfill disposal are being developed.

2.6.3 Record keeping. Records should be kept for all materials being disposed of by incineration or landfill. These records should show the;

- a) Name and address of the disposal facility,
- b) Method of disposal,
- c) Description and amount disposed of,
- d) Date of disposal,
- e) Source of material disposed of, and
- f) Name of carrier

These records should be handled in the same manner as outlined in 2.4.4.

2.6.4 Licensed facilities. At present, there are no facilities available in Canada that are licensed to dispose of PCBs. In addition, there are no licensed central collection-storage facilities. However, discussions are taking place to alleviate this situation. Until these facilities are developed it will be necessary to store PCB contaminated materials on the generator's premises.

REFERENCES

- Canadian Standards Association, 1947. *Standard C88 Power Transformers and Reactors*, Ottawa.
- Canadian Standards Association, 1959. *Standard C2, Single-phase and Three-phase Distribution Transformers, Type ONAN and LNaN*, Ottawa.
- Duvall, D.S. and W.A. Rubey, 1977. *Laboratory Evaluation of High Temperature Destruction of Polychlorinated Biphenyls and Related Compounds*. Technical Development Report UDRI-TR-77-01. U.S. Environmental Protection Agency, Cincinnati, Ohio.
- MacDonald, L.P., D.J. Skinner, F.J. Hopton and G.H. Thomas, 1977. *Burning Waste Chlorinated Hydrocarbons in a Cement Kiln*. Technology Development Report EPS 4-WP-77-2. Fisheries and Environment Canada, Ottawa.

APPENDIX I

HAZARD LABELS

SEVERE HAZARD EXTREME DANGER			
HEALTH SANTÉ	FIRE INCENDIE	ENVIRONMENT ENVIRONNEMENT	REACTIVITY REACTIVITÉ
CONTENTS / CONTIENT			
DISPOSAL ELIMINATION			
HANDLING MANIPULATION		TEL. TEL.	
ORIGINATOR / EXPÉDITEUR		DATE	
04-1914 (01/77)			

DEPARTMENT OF SUPPLY AND SERVICES CATALOGUE NUMBER 7690-21-036-2214

APPENDIX II

EPS REGIONAL OFFICES

Regions	Environmental Emergency Coordinators			Contaminants Control Coordinators		
	Names	Addresses	Telephones	Names	Addresses	Telephones
Atlantic	Dr. F. C. Duerden	16th Floor, 5151 George St., Halifax, N. S. B3J 1M5	Emergency (902) 426-6200 Office (902) 426-2576	Mr. E. Caldwell	Same	Office (902) 426-6132
Quebec	Mr. F. Leduc	5th Floor, 2020 University St., Montreal, Quebec. H3A 2A5	Emergency (514) 283-2333 Office (514) 283-2345	Mr. H. Alves	Same	Office (514) 283-6418
Ontario	Mr. N. Vanderkooy	135 St. Clair Ave. W., Toronto, Ontario. M4V 1P5	Emergency (416) 966-5840 Office (416) 966-5840	Mr. T. Leah	Same	Office (416) 966-5840
Northwest	Mr. R. K. Pettigrew	Room 804, 9942 - 108th St., Edmonton, Alberta. T5K 2J5	Emergency (403) 425-5128 Office (403) 425-5128	Dr. R. Edwards	Same	Office (403) 425-4574
Pacific	Mr. I. Robertson	Kapilano 100 Park Royal West Vancouver, B.C. V7T 1A2	Emergency (604) 544-6100 Office (604) 544-1370	Mr. D. Wilson	Same	Office (604) 544-6711

APPENDIX III

MINISTRY OF THE ENVIRONMENT CONTACTS

<u>OFFICES</u>	<u>TELEPHONE NUMBERS</u>	<u>TELEX NUMBERS</u>
Central Region 150 Ferrand Drive DON MILLS, Ontario M3C 3C3	(416) 424-3000 (24-hours)	06-966561
DISTRICT OFFICES		
12 Fairview Road BARRIE, Ontario L4N 4P3	(705) 726-1730 (24-hours)	
Highway 11, South GRAVENHURST, Ontario POC 1G0	(705) 687-3408	
1226 White Oaks Blvd. OAKVILLE, Ontario L6H 2B9	(416) 844-5747 (24-hours)	
139 George Street, N. PETERBOROUGH, Ontario K9J 3G6	(705) 743-2972	029844
West Central Region 140 Centennial Pkwy. N. STONEY CREEK, Ontario L8E 3H2	(416) 561-7410 (24-hours)	0218412
DISTRICT OFFICES		
Box 219 400 Clyde Road CAMBRIDGE, Ontario N1R 5W6	(519) 623-2080 (24-hours)	
637 Niagara Street, N. WELLAND, Ontario L3C 1L9	(416) 735-0431 (24-hours)	

OFFICESTELEPHONE NUMBERSTELEX NUMBERS

Southeastern Region
P.O. Box 820
133 Dalton Street
KINGSTON, Ontario
K7L 4X6

(613) 549-4000
(24-hours)

0262264

DISTRICT OFFICES

15 Victoria Avenue
BELLEVILLE, Ontario
K8N 1Z5

(613) 962-9208
(24-hours)

4 Montreal Road
CORNWALL, Ontario
K6H 1B1

(613) 933-7402
(24-hours)

2378 Holly Lane
Suite 204
OTTAWA, Ontario
K1V 7P1

(613) 521-3450
(24-hours)

1000 MacKay Street
PEMBROKE, Ontario
K8A 6X1

(613) 732-3643
(24-hours)

Southwestern Region
985 Adelaide Street S.
LONDON, Ontario
N6E 1V3

(519) 681-3600
(24-hours)

024822

DISTRICT OFFICES

435 Grand Avenue W.
CHATHAM, Ontario
N7L 3Z4

(519) 352-5107
(24-hours)

220 - 11th Street E.
Suite 108
Nortown Plaza
OWEN SOUND, Ontario
N4K 1T9

(519) 371-2901
(24-hours)

242-A Indian Road S.
Suite 209-S
SARNIA, Ontario
N7T 3W4

(519) 336-4030
(24-hours)

250 Windsor Ave.
6th Floor
WINDSOR, Ontario
N9A 6V9

(519) 254-5129
(24-hours)

OFFICESTELEPHONE NUMBERSTELEX NUMBERS

Northeastern Region
469 Bouchard Street
SUDBURY, Ontario
P3E 2K8

(705) 522-8282
(24-hours)

0277357

DISTRICT OFFICES

1500 Fisher Street
Northgate Shopping Centre
NORTH BAY, Ontario
P1B 2H3

(705) 476-1001
(24-hours)

74 Church Street
PARRY SOUND, Ontario
P2A 1Z1

(705) 746-2139

445 Albert Street E.
SAULT STE. MARIE
Ontario
P6A 2J9

(705) 949-4640
(24-hours)

02777100

83 Algonquin Blvd. W.
TIMMINS, Ontario
P4N 2R4

(705) 264-9474
(24-hours)

027-81610

Northwestern Region
Ontario Government Building
435 James Street S.
THUNDER BAY, Ontario
P7C 5G6

(807) 475-1205
(24-hours)

0734314

DISTRICT OFFICE

808 Robertson Street
KENORA, Ontario
P9N 1X9

(807) 468-5578

APPENDIX IV

RESPECTING

THE PCB CONTENT OF WASTE OILS

FOR SPECIFIC APPLICATIONS

1. WASTE OILS USED FOR USE
SUPPLEMENTARY TO INTERIM GUIDELINES

RESPECTING

POLYCHLORINATED BIPHENYLS

IN

WASTE OILS

2. WASTE OILS USED AS A
MATERIAL FOR RE-REFINED
LUBRICANTS AND INDUSTRIAL
SPECIFICATIONS

SAMPLING AND ANALYSIS

1. AS AN INTERIM MEASURE, IN THE PERIOD 1978 TO APRIL, 1979,
SAMPLES OF WASTE OIL IN STORAGE FOR THESE APPLICATIONS
SHALL BE TAKEN FOR MONITORING OF THE ENVIRONMENT INITIATION
AND ANALYSIS.

April, 1978

2. BY APRIL, 1979, STORAGE OF WASTE OIL COLLECTION SYSTEMS
MUST BE PREPARED TO SUBMIT TO THE MONITORING OF THE ENVIRONMENT
A CERTIFIED ANALYSIS OF THE PCB CONTENT OF WASTE OILS
IN STORAGE FOR SPECIFIC APPLICATIONS.

INTERIM GUIDELINE

RESPECTING

THE PCB CONTENT OF WASTE OILS

FOR SPECIFIC APPLICATIONS

1. WASTE OILS USED FOR DUST
SUPPRESSION ON RURAL ROADS 25 ppm maximum
2. WASTE OILS USED AS A
SUPPLEMENTARY FUEL IN
CEMENT MANUFACTURE 100 ppm maximum
3. WASTE OILS USED AS A RAW
MATERIAL FOR RE-REFINED
LUBRICANTS AND CHEMICAL
SPECIALTIES 25 ppm maximum

SAMPLING AND ANALYSIS

1. AS AN INTERIM MEASURE, IN THE PERIOD 1978 TO APRIL, 1979,
SAMPLES OF WASTE OIL IN STORAGE FOR THESE APPLICATIONS
SHALL BE TAKEN FOR MINISTRY OF THE ENVIRONMENT INSPECTION
AND ANALYSIS.
2. BY APRIL, 1979, OWNERS OF WASTE OIL COLLECTION SYSTEMS
MUST BE PREPARED TO SUBMIT TO THE MINISTRY OF THE ENVIRON-
MENT A CERTIFIED ANALYSIS OF THE PCB CONTENT OF WASTE OILS
IN STORAGE FOR SPECIFIC APPLICATIONS.

INTRODUCTION

There is mounting evidence of widespread PCB contamination of waste oils that are collected by disposal contractors and used or sold as a dust suppressant on rural roads, as a raw material in re-refining processes and as a supplementary fuel in cement manufacture.

The quantity of waste oil collected in Ontario for these purposes is estimated to be in the order of 10 million gallons annually. Most of this oil appears to exhibit some evidence of PCB contamination.

The objective of this guideline is to prevent high PCB content waste oils from being dispersed into the environment, to establish an acceptable level of PCB contamination in these oils which will minimize risks due to direct exposure and to provide an interim measure of control pending further assessments of waste oil utilization practices and the development of alternative outlets for waste oils.

DISCUSSION

Road Oiling

It is estimated that some 6.5 million gallons of waste oil are used annually as a dust suppressant on rural roads in Ontario. The oil is generally applied in the Spring and Summer at a rate of between 0.2 and 0.3 gallons per square yard (1.09 to 1.6 litres per square metre) up to a maximum of 0.5 gallons per square yard (2.7 litres per square metre).

The potential impact of PCB contamination in this oil is two-fold:

1. It represents an input of PCB to the environment which may ultimately enter man's food chain and thus impact indirectly on man;
2. It poses a potential hazard of direct exposure of PCB by persons engaged in road oiling and persons in the vicinity of the road.

Ideally, all inputs of PCB to the environment should be eliminated. In the case of road oiling this is simply not practicable at this time. If the practice of road oiling is prohibited then there is no alternative outlet for some 6.5 million gallons of waste oil collected annually in Ontario for this purpose.

Based on the best available information relating to potential exposure to PCB from road oiling, taking into account the rate of evaporation of PCB from the oil, the potential health effects and occupational health standards, Ministry experts have concluded that an acceptable upper limit of PCB in waste oil used for road oiling is 25 ppm.

This should be regarded as an interim measure pending further review and assessment of road oiling practices.

At 25 ppm, the maximum potential release of PCB to the environment would be 1,300 pounds per year.

Supplementary Fuel in Cement Manufacture

Currently, the only plant authorized to use waste oil as a supplementary fuel in cement manufacturing is St. Lawrence Cement in Mississauga. The efficiency of the cement kiln to destroy PCB has been demonstrated and the Ministry will continue to permit the Company to accept waste oils contaminated with PCB at levels below 100 ppm. Available data on PCB in waste oils indicate that of 22 samples, only 2 contained PCB levels exceeding 100 ppm.

Re-refining and Chemical Specialties

Certain types of waste oil are used as raw materials in the manufacture of automotive lubricants and in the manufacture of machine cutting oils and chemical specialties such as industrial anti-foam agents.

These applications represent valuable and economically desirable re-use of waste materials. However, the nature and usage of the products and the methods of re-refining are such that any PCB present in the raw material waste oil will be dispersed into the environment. This is comparable to the practice of road oiling.

The total quantity of oil used for these purposes in Ontario is estimated to be in the order of 1.5 million gallons per year. Consequently, if the 25 ppm guideline is applied to raw materials for re-refining and chemical specialties, then the total potential release of PCB to the environment is 375 pounds per year.

In actual fact, limited measurements that have been conducted on these raw materials indicate PCB contents of 10-15 ppm so that the actual potential PCB release may be less than 375 pounds.

Action Taken in Other Jurisdictions

The ubiquitous nature of PCB contamination in waste oils has posed similar problems of PCB management and disposal to other regulatory agencies. Most jurisdictions have adopted the view that some minimum acceptable level of PCB contamination in waste oils must be recognized in order to direct high level PCB contaminated materials to available disposal outlets.

All agencies recognize that the ideal acceptable level of contamination is zero but that the application of such a criterion would be disruptive to society as a whole, and is impossible to administer and simply not achievable at this time.

Interim Guidelines for PCBs in waste oils are now being considered by Environment Canada, recommending that oils containing less than 0.005% (50 ppm) PCB should not be subjected to constraints with respect to use and disposal.

The United States EPA has adopted a standard of 500 ppm or greater for materials that are subject to the controls under The Toxic Substances Control Act with respect to disposal and labelling.

The State of Michigan defines materials that are not subject to control under PCB regulations as those containing less than 100 ppm.

APPLICATION AND ADMINISTRATION

This guideline shall apply to all of the uses of waste oil identified in the discussion; namely, road oiling, re-refining, chemical specialty raw materials and supplementary fuel in cement manufacturing.

In the 1978-1979 period, samples of waste oil in storage tanks for these purposes will be collected for PCB analysis either by the operators or by Ministry staff.

Initially the Ministry of the Environment will carry out these analyses in the program described below.

Samples should be taken in such a manner as to be truly representative of the oil in the storage tanks, as far as this is practicable. Operators with multiple storage tanks may combine individual tank samples in proportion to the volume of the tanks to provide one single average sample.

During 1978, a comprehensive sampling and analysis program will be conducted by the Ministry. The objectives of this program will be:

- a) determine the extent of existing PCB contamination in waste oils, particularly those intended for use as dust suppressants on rural roads;
- b) identify any significant sources of high level PCB contaminated waste oils so that these may be eliminated from the waste oil collection system;
- c) determine the extent of PCB contamination in new off-the-shelf oil products to identify a baseline level of contamination.

The program is proposed in three phases. These are: 1. Sampling and analysis of waste oil currently in storage;

2. Sampling and analysis of all significant sources of waste oil currently serviced by the waste oil collectors;
3. Sampling and analysis of a broad spectrum of off-the-shelf oil products.

In addition, the second phase of a Provincial Lottery funded project to assess the environmental impact and effectiveness of used oil as a dust suppressant on rural roads will be continued.

In particular, this second phase will examine the transport of contamination from the road surface via surface run-off, airborne dusts and the up-take of contaminants in plants.

Pending the results of these investigations, the practice of the use of waste oils may be subject to further restrictions.

By April 1979, owners and operators of waste oil collection systems must be prepared to submit to the Ministry certified analyses of the PCB content of waste oils for specific applications to confirm compliance.

CA20NEV 78P56

Ontario, MOE.

POLLUTION PREVENTION AND WASTE MANAGEMENT GUIDELINES FOR
POLYCHLORINATED BIPHENYLS (PCB). 1978.

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